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REMARKS

Claims 1, 3, 4, 6-9, 11, 12 and 14-22 remain in this application. Claims 2, 5, 10 and 13 are previously cancelled. Claims 1, 3, 4, 6-9, 11, 12 and 14 are rejected.

Claims 1, 4, 7-9 and 12 are amended herein to clarify the invention, to broaden language as deemed appropriate and to address matters of form unrelated to substantive patentability issues. No new issues are believed to be raised by the changes to the claims

For the convenience of the Examiner, APPENDIX I is provided herewith having a complete set of pending claims with all amendments effected therein.

Claim 1, 3, 4, 6-9, 11, 12 and 14-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hayashida et al. (U.S. Patent No. 6,409,596) in view of Yamashita et al. (U.S. Patent No. 5,982,377).

The Examiner's rejection is respectfully traversed for the foregoing reasons.

Claim 1 is amended for clarification purposes and now recites that the game system includes an image processor for forming display images of all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion. Claims 4, 7, 8, 9 and 12 are amended in a similar manner

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In the invention, multiple objects are formed by using each of the plurality of perspective conversion matrices based on the vertex coordinates of one polygon, and images of the objects are displayed at the same time. The position or angle of the objects is different from each other. Thus, the game system can display a number of objects formed by the game system at the same time based on a single polygon. Consequently, the game system cause the objects to move freely in all directions effectively with ease.

Hayashida et al. and Yamashita et al., taken either alone or in combination with one another, do not disclose, teach or suggest forming multiple objects using a single polygon.

Hayashida et al. describes a game device including a geometrizer 110 which receives shape data from a shape data ROM 111 and obtains data by perspectively converting shape data designated by a conversion matrix sent from a CPU 101 and converting the coordinate system to a view coordinate system in the three-dimensional space (col. 8, lines 49-58). Hayashida et al. also shows renewing the conversion matrix when the viewpoint is switched (col. 14, lines 58-67).

Hayashida does not teach that the system stores the data of a plurality of perspective conversion matrices for use at the same time. Therefore, Hayashida merely teaches renewing the matrix because when viewpoint is switched.

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Yamashita describes utilizing six conversion matrices to perform coordinate conversion processing. However, in the game system of Yamashita, one coordinate is calculated using the six conversion matrices.

Thus, both Hayashida et al. and Yamashita et al. describe a game system which forms a single object by using one or more perspective conversion matrices based on the vertex coordinates of a single polygon, and displays the image of the object at the same time. Thus, the systems display one object that corresponds to that single polygon.

Hayashida et al. and Yamashita et al. do not teach or suggest that the game system comprises an image processor for forming display images of multiple three-dimensional objects, i.e., all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion as now set forth in claims 1, 4, 7, 8, 9 and 12.

The disclosure of the formation of multiple objects from a single polygon, in combination with the remaining features set forth in the claims, is entirely absent in both Hayashida et al. and Yamashita et al. and therefore one skilled in the art could not combine these reference and arrive at the present claimed invention.

In view of the foregoing, it is respectfully submitted that the Examiner's rejection of claims 1, 3, 4, 6-9, 11, 12 and 14-22 under 35 U.S.C. §103(a) as being

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unpatentable over Hayashida et al. in view of Yamashita et al. has been overcome and should be removed and that the present application is now in condition for allowance.

Applicant respectfully requests a one month extension of time for responding to the Office Action. Please charge the fee of \$110 for the extension of time to Deposit Account No. 10-1250.

In light of the foregoing, the application is now believed to be in proper form for allowance of all claims and notice to that effect is earnestly solicited. Please charge any deficiency or credit any overpayment to Deposit Account No. 10-1250.

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APPENDIX I**ALL PENDING CLAIMS WITH AMENDMENTS EFFECTED THEREIN**

1. A game system which performs perspective projection conversion of vertex coordinates of a plurality of polygons forming three-dimensional objects located in an imaginary three-dimensional space based on perspective conversion matrix, and forms display images of the three-dimensional objects on a projection plane of a viewpoint coordinate system, comprising:

a storage unit for storing at least data of the vertex coordinates of the plurality of polygons and data of the perspective conversion matrices;

a coordinate conversion unit for reading out the data of the vertex coordinates of the plurality of polygons and the data of a plurality of perspective conversion matrices different from each other from the storage unit, and for performing perspective projection conversion of each of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices whereby a plurality of the conversion matrices are used at the same time; and

an image processor for forming display images of all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion,

wherein the coordinate conversion unit comprises:

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a unit for fixing the data of the vertex coordinates of the plurality of polygons read out;

a unit for newly reading out data of a plurality of perspective conversion matrices different from each other from the storage unit instead of the data of the plurality of perspective conversion matrices already read out; and

a unit for performing the perspective projection conversion of each fixed data of the vertex coordinates of the plurality of polygons by using each of the plurality of the perspective conversion matrices newly read out.

3. A game system according to claim 1, wherein the newly reading unit repeatedly reads out the data of the plurality of perspective conversion matrices.

4. A game system which performs perspective projection conversion of vertex coordinates of a plurality of polygons forming three-dimensional objects located in an imaginary three-dimensional space based on perspective conversion matrix, and forms a display image of the three-dimensional objects on a projection plane of a viewpoint coordinate system, comprising:

a storage unit for storing at least data of the vertex coordinates of the plurality of polygons and data of the perspective conversion matrices;

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a transfer unit for transferring the data of the vertex coordinates of the plurality of polygons and the data of a plurality of perspective conversion matrices different from each other from the storage unit;

a coordinate conversion unit for receiving the transferred data and for performing perspective projection conversion of each of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices; and

an image processor for forming display images of all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion,

wherein the transfer unit comprises a unit for newly transferring only data of the plurality of perspective conversion matrices different from each other after transferring the data of the vertex coordinates of the plurality of polygons and data of a plurality of perspective conversion matrices different from each other, and

wherein the coordinate conversion unit comprises a unit for fixing data of the vertex coordinates of the plurality of polygons transferred, and a unit for performing perspective projection conversion of each fixed data of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices newly transferred.

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6. A game system according to claim 4, wherein the newly reading unit repeatedly reads out the data of the plurality of perspective conversion matrices.

7. A display image forming method performed by a game system which performs perspective projection conversion of vertex coordinates of a plurality of polygons forming three-dimensional objects located in an imaginary three-dimensional space based on perspective conversion matrix, and forms a display image of the three-dimensional objects on a projection plane of a viewpoint coordinate system, the method comprising the steps of:

storing at least data of the vertex coordinates of the plurality of polygons and data of the perspective conversion matrices;

reading out the data of the vertex coordinates of the plurality of polygons and data of a plurality of perspective conversion matrices different from each other from the storage unit, and performing perspective projection conversion of each of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices; and

forming display images of all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion,

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wherein the step of performing the perspective conversion comprises the steps of:

fixing the data of the vertex coordinates of the plurality of polygons read out; newly reading out data of a plurality of perspective conversion matrices different from each other from the storage unit instead of the data of the plurality of perspective conversion matrices already read out; and

performing the perspective projection conversion of each fixed data of the vertex coordinates of the plurality of polygons by using each of the plurality of the perspective conversion matrices newly read out.

8. A display image forming method performed by a game system which performs perspective projection conversion of vertex coordinates of a plurality of polygons forming three-dimensional objects located in an imaginary three-dimensional space based on perspective conversion matrix, and forms a display image of the three-dimensional objects on a projection plane of a viewpoint coordinate system, the method comprising the steps of:

storing at least data of the vertex coordinates of the plurality of polygons and data of the perspective conversion matrix;

transferring the data of the vertex coordinates of the plurality of polygons and data of a plurality of perspective conversion matrices different from each other from the storage unit;

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receiving the transferred data and performing perspective projection conversion of the vertex coordinates of the plurality of polygons for each of the plurality of perspective conversion matrices; and

forming display images of all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion,

wherein the step of transferring comprises a step of newly transferring only data of the plurality of perspective conversion matrices different from each other after transferring the data of the vertex coordinates of the plurality of polygons and data of a plurality of perspective conversion matrices different from each other, and

wherein the step of performing perspective projection conversion comprises the steps of fixing data of the vertex coordinates of the plurality of polygons transferred, and performing perspective projection conversion of each fixed data of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices newly transferred.

9. A computer-readable storage medium carrying a game program executed in a game system which performs perspective projection conversion of vertex coordinates of a plurality of polygons forming three-dimensional objects

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located in an imaginary three-dimensional space based on perspective conversion matrix, and forms a display image of the three-dimensional objects on a projection plane of a viewpoint coordinate system, the game program controls a computer in the game system to function as:

a storage unit for storing at least data of the vertex coordinates of the plurality of polygons and data of the perspective conversion matrices;

a coordinate conversion unit for reading out the data of the vertex coordinates of the plurality of polygons and data of a plurality of perspective conversion matrices different from each other from the storage unit, and for performing perspective projection conversion of each of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices; and

an image processor for forming display images of all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion,

wherein the coordinate conversion unit comprises:

a unit for fixing the data of the vertex coordinates of the plurality of polygons read out;

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a unit for newly reading out data of a plurality of perspective conversion matrices different from each other from the storage unit instead of the data of the plurality of perspective conversion matrices already read out; and

a unit for performing the perspective projection conversion of each fixed data of the vertex coordinates of the plurality of polygons by using each of the plurality of the perspective conversion matrices newly read out.

11. A medium according to claim 9, wherein the newly reading unit repeatedly reads out the data of the plurality of perspective conversion matrices.

12. A computer-readable storage medium carrying a game program performed by a game system which performs perspective projection conversion of vertex coordinates of a plurality of polygons forming three-dimensional objects located in an imaginary three-dimensional space based on perspective conversion matrix, and forms a display image of the three-dimensional objects on a projection plane of a viewpoint coordinate system, the game program controls a computer in the game system to function as:

a storage unit for storing at least data of the vertex coordinates of the plurality of polygons and data of the perspective conversion matrices;

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a transfer unit for transferring the data of the vertex coordinates of the plurality of polygons and data of a plurality of perspective conversion matrices different from each other from the storage unit;

a coordinate conversion unit for receiving the transferred data and for performing perspective projection conversion of the vertex coordinates of the plurality of polygons for each of the plurality of perspective conversion matrices; and

an image processor for forming display images of all three-dimensional objects, which correspond to the plurality of polygons after the perspective projection conversion, on the projection plane of the viewpoint coordinate system at the same time based on the vertex coordinates of the plurality of polygons after the perspective projection conversion,

wherein the transfer unit comprises a unit for newly transferring only data of the plurality of perspective conversion matrices different from each other after transferring the data of the vertex coordinates of the plurality of polygons and data of a plurality of perspective conversion matrices different from each other, and

wherein the coordinate conversion unit comprises a unit for fixing data of the vertex coordinates of the plurality of polygons transferred; and a unit for performing perspective projection conversion of each fixed data of the vertex coordinates of the plurality of polygons fixed by using each of the plurality of perspective conversion matrices newly transferred.

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14. A medium according to claim 12, wherein the newly reading unit repeatedly reads out the data of the plurality of perspective conversion matrices.

15. A game system according to claim 1, wherein the coordinate conversion unit performs the perspective projection conversion to produce a plurality of images of three-dimensional objects by using the same set of the vertex coordinates of the plurality of polygons and the different perspective conversion matrices.

16. A game system according to claim 4, wherein the coordinate conversion unit performs the perspective projection conversion to produce a plurality of images of three-dimensional objects by using the same set of the vertex coordinates of the plurality of polygons and the different perspective conversion matrices.

17. A display image forming method according to claim 7, wherein the perspective projection conversion is performed to produce a plurality of images of three-dimensional objects by using the same set of the vertex coordinates of the plurality of polygons and the different perspective conversion matrices.

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18. A display image forming method according to claim 8, wherein the perspective projection conversion is performed to produce a plurality of images of three-dimensional objects by using the same set of the vertex coordinates of the plurality of polygons and the different perspective conversion matrices.

19. A storage medium according to claim 9, wherein the coordinate conversion unit performs the perspective projection conversion to produce a plurality of images of three-dimensional objects by using the same set of the vertex coordinates or the plurality of polygons and the different perspective conversion matrices.

20. A storage medium according to claim 12, wherein the coordinate conversion unit performs the perspective projection conversion to produce a plurality of images of three-dimensional objects by using the same set of the vertex coordinates of the plurality of polygons and the different perspective conversion matrices.

21. A game system according to claim 1, wherein by performing perspective projection conversion of each of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices, a plurality of the conversion matrices are used at the same time.

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22. A game system according to claim 4, wherein by performing perspective projection conversion of each of the vertex coordinates of the plurality of polygons by using each of the plurality of perspective conversion matrices, a plurality of the conversion matrices are used at the same time.